The Soybean Digest

Official Publication

OF

THE AMERICAN SOYBEAN ASSOCIATION

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THE Soybean Digest

GEO. M. STRAYER, Editor KENT PELLETT, Managing Editor
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THE AMERICAN SOYBEAN ASSOCIATION

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BEANS IN NEW REGIONS

THAT the possibilities of the soybean in the human diet are being explored on widely different fronts during the present world crisis is indicated by two different publications that have recently come to the editorial desk.

Mahatma Gandhi, great Indian leader and vegetarian, realizes the nutritional value of the soybean and has been preaching it to the masses of India, according to an article by Marion Reid, in December *Health Culture*. Extensive quotations are taken from *Harijan*, Gandhi's publication, that stress the possibilities of the soybean in relieving the widespread malnutrition existing in India.

The problems of India are somewhat similar to those of China where the soybean originated. The country is badly overpopulated with a lack of space for growing needed animal products. So the soybean, a concentrated source of oil and protein, should make a real contribution to Indian agriculture if soil and climate are suitable.

And in *Boletin Indigenista*, published by the Inter-American Indian Institute, we learn that President Comacho of Mexico has included the cultivation of soybeans in his program for improving the diet of the Mexican Indians. After a three-day visit among the Mezquital Indians, in which he observed the "diet deficiencies to which poverty has accustomed the Indians, the sickness and the high mortality rate which undernourishment and a lack of drinking water carry with them," Comacho approved the investment of eight million pesos for immediate measures to improve the lot of these Indians.

Among the measures approved by the president, according to the *Boletin*, are "the planting of Leguminous Soybeans, the food value of which is equivalent to milk, meat or eggs; the establishment of kitchens in order to teach Indian groups how to cook and season the alimental products derived from the soybean and above all how to eat them, trying to overcome the traditional resistance which might arise to a new diet or, to be more exact, to the new products which will complement corn, chile and occasionally the beans and herbs which they now eat."

LET'S PREVENT DISEASE

EACH year the insect pests and plant diseases take a terrific toll of American crops. To be exacting in attempts to measure such damage would be folly. Yet every farmer feels the effects through decreased yields.

Soybeans are not native to this country. Pests and diseases of the soybean were likewise unknown until the host plant was introduced. During the first few years that the bean is grown in a community it is thought to be relatively disease-free and insect repellent. But we are now finding, in the bean growing sections, that there are pests which attack the crop. Likewise there are diseases which are beginning to exact their deductions from the acre yields. We are learning to recognize some of them.

But did it ever occur to you that at no place in the United States of America is disease and pest study being done, to any degree, on soybeans? That the second largest cash grain crop in several states has gone unrecognized from the standpoint of entomology and pathology? That scores of men are working on corn diseases and pests, that like numbers of them are studying small grain pests, but nobody specifically designated to work on soybeans?

Maybe it would be wise to start research work on soybean diseases and pests before they become disastrous, rather than waiting for that time to arrive. Maybe we should learn to recognize them, their damage, and their control measures now, instead of waiting until we are forced to such measures. Unhurried, careful, exacting research brings more comprehensive analysis than that done under pressure of disaster. We suggest that our state experiment stations, along with the U.S.D.A., institute such work now.

SOME MUSTS FOR 1943

NOW is the time to save headaches in harvesting and storing soybeans next fall. There will be plenty of troubles in this attempt to up the nation's bean acreage again, with a shortage of help and machinery. But careful planning may help.

Points being especially urged by experienced growers and agronomists this year are quickly enumerated.

1. Earlier planting, probably ahead of corn in sections bothered with the corn borer.

2. Earlier maturing and adapted varieties, especially in sections caught by last fall's premature freezes.

3. Seed purity.

4. Row planting for control of weeds.

5. Inoculation of all seed. The U. S. Department of Agriculture is now backing *The Soybean Digest* in our emphasis on inoculation for all-out bean production. Local AAA committeemen are being asked to stress inoculation.

6. With germinability in some sections the worst it has been in years, testing of all seed and critical reading of tests. If it is necessary to plant beans of lower germination than has seemed advisable in the past, more seed per acre should be planted. Allowance should be made for weak beans, as well as for dead ones.

If growers are unable to obtain satisfactory seed, they may have to fall back on beans that are being made available for seed purposes by Commodity Credit Corporation. But it is our suggestion that CCC seed should be bought *only if no other source of supply is available.* The CCC makes no guarantee of seed purity and their bins may contain a number of different varieties all mixed in together. Of course mixed seed of good germination is much better than no seed at all, or seed of low germination.

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The INOCULANT in the CARTON

Beneficial Bacterial Relationships

By LEWIS T. LEONARD

Bacteriologist, Soil and Fertilizer Investigations, Bureau of Plant Industry, U. S. Department of Agriculture

ONE of the fundamentals of our cropping system which has come down through the centuries is the association of leguminous plants with minute plants called bacteria. When this partnership started is unknown but written history indicates farmers of long ago observed that soil from a field in which a particular legume plant grew satisfactorily was of value in assisting the growth of the same crop elsewhere. The reason therefor was unknown but later as methods in chemistry and bacteriology were found and refined, it became possible to prove that this relationship consisted of bacteria and plant, and that it was a natural means of utilizing the nitrogen gas of the atmosphere for plant growth. Of our crop plants the legumes, which include soybeans, alfalfa, vetch and many others, are the only ones through which air nitrogen is made available and on account of this fact they have become very important in our agricultural economy.

Sources of Legume Bacteria

When associated with the plant the bacteria of legumes live in root growths called nodules or tubercules (see illustration). At the death of the plant or even before under certain conditions, these growths rot and thereby pass the nodule bacteria to the soil again. This impregnates the area around the roots and soil from this place may be satisfactory for use elsewhere.

It is fortunate that legume bacteria may be isolated from nodules and grown in the absence of other organisms on artificially prepared food. This process requires special skill in bacteriology and special laboratory facilities. When one kind of bacteria is grown separate from others, it is called a pure culture. Pure cultures of legume bacteria are the means of collecting and maintaining organisms from different legumes and locations. Once obtained they may be tested for relationship to legumes other than the one from which they came, or for efficiency by application to related legumes in greenhouse and field. On the basis of ability to produce nodules on certain legumes only, these bacteria are separated into groups. Thus, the alfalfa group includes alfalfa, sweet clover and bur clover bacteria; the clover group, red, crimson, white and alsike clover organisms; and the vetch group, bacteria of vetches, garden, sweet and field peas. Soybean bacteria are in a group by themselves and therefore function only on the soybean.

About fifty years ago the first commercial cultures appeared. Much of this material was of poor quality and therefore did not enhance the cause of legume inoculation. However, within the last 20 years great improvements have been made in the commercial preparation of nodule bacteria cultures. This change is largely due to a better understanding of the subject, the employment of a highly skilled production personnel, better basic materials such as cultures and carriers, and better facilities for manufacture and control. The legume culture business has made its greatest expansion in the United States and facilities are now available for meeting promptly almost any demand.

Quality

Commercial cultures, or inoculants as they are sometimes called, are available under various trade names. Usually they may be procured from seedsmen or local farm organizations in season.

Efficiency in nodule bacteria cultures is based on ability to fix nitrogen from the air rather than on nodule formation alone. It is a matter of delicate adaptation of bacteria to plant and for that reason organisms ranging from high to low efficiency are found.

Since quality in inoculants cannot be easily determined, the farmer must largely depend upon the integrity of the manufacturer for a satisfactory product. To prevent the sale of undesirable material some state agencies and the U. S. Department of Agriculture conduct annual inspections on samples of the available commercial inoculants. In general, it is indicated from these inspections that the present quality of inoculants is excellent. Freshly prepared material is desirable and to prevent old cultures from being delivered to the farmer, an expiration date is usually placed on the label. After this date the package should not be bought or sold.

Methods of Application

"Inoculation" from an agricultural crop standpoint, is a term used to describe the treatment of seed or soil with nodule organisms. The important point about this process is to place efficient bacteria in goodly numbers where they will be in the best

Soybean root showing nodules in surrounding soil.

position to contact the roots as they form. This is most easily accomplished by seed treatment. Inoculation may be made with soil, as practiced by the primitive farmers and satisfactory results obtained. The more recent soil transfer method consists of sieving a large amount of inoculated soil and drilling or scattering it on the field to be treated. This extensive method entails considerable effort in soil collection and is a means of distributing weed seeds and disease organisms. Soil may also be used in small quantities by mixing with seed, with or without adhesives. One of the main objections to soil transfer of any kind, in addition to those already mentioned, is the doubt that usually arises as to its suitability.

The soil transfer method of inoculation has been largely superseded by the use of commercial legume bacteria cultures. The manner of applying these is usually printed on the package and it should be followed closely for best results. Soybeans and other legume seed are usually planted on a relatively small scale by independent farmers so that the hand method given in the commercial culture directions, or a process of local devising will do the job satisfactorily.

Conditions Affecting Nodule Bacteria

Widespread distribution of these organisms by natural means and through the use of artificially prepared cultures brings them in contact with many soil and climatic conditions which may affect their activities. In the absence of a legume crop for a long time, its nodule bacteria in the soil may disappear or lessen in numbers to such an extent that satisfactory inoculation would not take place were the legume planted again. Extreme soil acidity is usually detrimental to nodule bacteria. However, they differ in their ability to withstand acid conditions, the soybean bacteria being more tolerant than those of alfalfa and clover. Excessive drying of seed is harmful to nodule bacteria. Unnecessary exposure to sunlight should be avoided. Seed treated with nodule bacteria should not come into direct contact with caustic lime, seed disinfectants or concentrated fertilizers.

The Necessity and Value of Nodule Bacteria for Soybeans

On account of the fact that the soybean is an introduced crop which requires bacteria not supplied by any of our common crop legumes, it is especially desirable that seed be treated with the proper bacteria when planted for the first time. If soybean crops have been grown successfully on a farm, it is a question for local decision whether the artificial introduction of bacteria is advisable. Where doubt exists as to this point, it will be good insurance to inoculate. Nodule bacteria make possible good growth of soybeans on poor lands without the addition of nitrogenous fertilizer and often constitute the difference between success or failure. On richer soils, however, the contrast between noduled and unnoduled soybeans may not be great but since the plant in the absence of its bacteria feeds like a non-legume, the nitrogen in the unnoduled plant comes from the soil, not the air.

By virtue of greater and richer yields due to inoculation of soybean seed, greater amounts of oil and other products will result. To reach the maximum goals set for soybean growers, soybean seed should be treated with good quality inoculating material at the time of planting and planting should be made in soils prepared in accordance with the best practices of the community.

Center two rows of soybeans are not nodulated; the two rows on right and left are nodulated.

AAA TO STRESS INOCULATION

The U. S. Department of Agriculture, through the AAA, is stressing the general need of soybean inoculation this spring, according to word received by *The Digest*.

Although the AAA, due to "administrative problems," has not accepted Editor Goe. M. Strayer's suggestion that benefit payments be made for proof of soybean inoculation, local committeemen are being requested by the Washington office to stress the need for legume seed inoculation, using the information available from their state experiment stations, the agricultural extension service, and other local sources.

Following is the reply of M. C. Townsend, Director of the Food Production Administration, to Editor Strayer's letter:

DEPARTMENT OF AGRICULTURE
Washington

Mr. George M. Strayer
Secretary
American Soybean Association
Hudson, Iowa

Dear Mr. Strayer:

This is in reply to your letter of January 23 with respect to the possibilities of increasing soybean production through the proper inoculation of all soybean seed.

Your suggestions to require proper inoculation of all beans to be planted in 1943 and to make practice payments for all such inoculation raises several administrative problems. There are indications that the compulsory inoculation of seed to be planted in old soybean fields which were once inoculated would not be justified and it is certainly not practical to determine which fields need inoculation. Determination of compliance would be extremely difficult because of lack of tangible evidence of the operation of inoculation.

Therefore, at this time it does not appear to be practical to require that all soybean seed be inoculated or to provide a practice payment for this purpose. However, the importance and need of inoculants are being emphasized through the educational programs in connection with the Department's efforts to increase soybean production.

Your interest and suggestions are very much appreciated.

Sincerely yours,

M. Clifford Townsend, Director
Food Production Administration

★ BOOKS ★

TECHNIQUE OF PLYWOOD, by Charles B. Norris, I. F. Laucks, Inc., Seattle, Washington. The chapters of this are reprints of a series of articles on the technique of plywood. The subject matter is subdivided into five parts, the first section is devoted to strength, deformation and elastic stability of plywood sheets. Other sections relate to the two-dimensional elastic theory for wood and plywood, the manufacture of plywood and the warpage of plywood. The last division is devoted to bent, moulded and embossed plywood. A valuable contribution.

THE CHEMISTRY AND TECHNOLOGY OF THE SOYBEAN AND ITS DERIVED PRODUCTS, Part I, by Klare S. Markley, of the Northern Regional Research Laboratory, has been issued by the U. S. Department of Agriculture.

Part I deals with "Chemical Composition and Properties of Constituents and Derived Products." Chapters include composition and properties, mineral constituents, proteins and other nitrogenous constituents, enzymes, carbohydrates, glycosides, pigments, vitamins and oil and oil soluble constituents. This appears to be a rather exhaustive treatment of the whole subject.

—s b d—

SOYBEANS ON OUR COVER

Readers are asked to note the cover pages of this issue of THE SOYBEAN DIGEST. These pages are printed on an enameled paper, a Michigan Paper Company product, coated with alpha protein, made from soybeans. Note the high finish. One of the most important prospective uses of soybean protein is as paper coating, an example of many industrial outlets that should open to soybean products after the war.

LIFE RAFT RATION • *Canadian Navy Adopts Soy*

By JAMES L. DOIG
Floya Milling Company
Montreal, Quebec

AN ARMY still marches on its stomach, and transportation and preparation of food for rapidly moving troops is one of the major problems an army command must face, and any breakdown of the Commissariat spells trouble, as many of us who lived on hard tack and bully beef for days at a time, in the last war, will heartily endorse.

With these experiences in mind, we believed that the advances made in food concentrations, would be made full use of in future wars, and concentrated rations of high biological value would be a standard item in military equipment. However, here as in many other ways, the German high command were away ahead of our military authorities, and concentrated rations were issued to the German troops as far back as 1930, soya flour being one of its main ingredients.

Shortly after Hitler and his Nazi cohorts gained control in Germany the German staff began to build a Blitz Army, mechanically equipped to strike paralyzing blows, and move with amazing speed. Equipment was designed with these two main objects in constant view. With these essentials taken care of, typical German tactics, treachery and surprise, were all that was necessary to overrun unprepared Europe; and the war was on.

Nazi Food Pills

About 1936 reports began to trickle out of Germany about so-called "Nazi food pills," which enabled troops on the march to carry two to three weeks rations in a knapsack, requiring only liquid, tea, coffee, milk or water to provide balanced rations, and ultimately samples found their way here. They were found to be a form of biscuit and like most German substitutes, efficient, but crude and unpalatable.

The German biscuit was oblong in shape, about three inches by two, about one quarter of an inch thick, and contained roughly in each pound, about 200 grams of carbohydrate, 100 grams each of fat and proteins, with a moisture content around 10%. Its caloric value was around 1,500. It was in appearance somewhat similar to Scotch oatcakes, but rather dry and unpalatable. However, the physical condition of the German troops and the rapidity of their advance in the early days of the Polish campaign, left little doubt of the efficiency of the ration.

It is interesting here to note that a German report at this period said the emergency ration had been proven a factor in the prevention of rheumatism and trench fever.

We felt that with our greater access to food items, we should be able to produce a better ration than the German, and our researches by this time had so far advanced, that we were able to specify its probable food value. Roughly the idea was "To produce a combination of food elements, baked in the form of a small biscuit, to give a balanced concentrated food of a caloric value of 2,000, and containing in each pound at least 160 grams of carbohydrate, 150 grams protein, 100 grams fat, and the balance consisting of mineral contents, and with a B_1 content of at least 600 International units per pound.

— Courtesy Food in Canada

The Royal Canadian Navy's life ration food package is shown in upper photo. Biscuits, chocolate bar and milk tablet are all of low water content. Bottom picture shows contents of food package laid out and indicates the careful volume planning.

Not So Simple

The production of a concentrated food is, in theory quite a simple affair, we know the daily food calories necessary for complete nourishment of the average body; we know the balance of carbohydrates, proteins, fats and minerals the body requires; we are even beginning to know what vitamins are necessary, so all you have to do is, mix them up in the correct proportions, compress and bake them up, and there you are. Unfortunately, it is not so simple as that, and perhaps if I outline the development of this biscuit it will give you some idea of the research necessary before a product such as this, is ready for use.

One particular point we kept constantly in mind, was that the biscuit must be more than a concentrated food, it must be a completely balanced ration, palatable and requiring only water to provide adequate nourishment, and the roughages required for normal bowel movement.

Carbohydrates, fats and minerals presented no difficulty, but the source of complete protein presented a real problem. Many sources, including dried meats, were tested and abandoned for various reasons, digestibility, cost, etc., and finally soya was tried. Ordinary soya flour was found unsuitable, but a specially processed flour was finally produced by Continental Soya Co., of Lachine, which proved just right.

Check With Rats

A special grade of shortening to insure adequate keeping qualities was specified and fresh eggs and full cream milk gave added flavor and nourishment. Particular attention was given to the salt content to make

(Continued on page 14)

The Food Situation -- *and* The Feed Situation

By J. A. McCONNELL
Chairman Feeds Industry Council
Ithaca, N. Y.

● *The Feeds Industry Council, of which Mr. McConnell is chairman, is composed of leading men in the industry and college specialists. After an exhaustive study of the feeds situation which occupied many weeks, the Council is urging a voluntary program of limited use of protein by feeders and dealers. It feels that this program, which has the approval of the U.S.D.A., will be preferable to protein rationing.*—EDITOR.

RECENTLY, there have shown up, all over the country, great shortages of by-product feeds with which to supplement properly feeding grains. Government officials have been slow to admit that there was any shortage, although every farmer, every feed dealer, and every feed manufacturer knew this. Some fortunate dealers might have enough of all kinds of ingredients but, in general, great shortages are showing up. These shortages appear to be deep-seated and will be likely to continue.

The essential facts on the feed situation are:

(1) A series of above-the-average grain crops, due to better-than-average rainfall, extending over six years, has made it possible to have enough grain to expand our livestock population to a point above anything that the country has ever known.

(2) When we got into war, this country, never having faced a shortage of feed crops, figured that there was no end to what could be done in the way of expanding our livestock production for purposes of feeding great numbers of people in other nations.

Effect of Ceilings

(3) The United States government, as a national policy, by the use of ceilings and the ever-normal granary, arbitrarily held down the price of feed and grain, while at the same time, by government action in buying through Lend-Lease for our Allies and for the armed forces, raised the prices of animal products, particularly hogs, to a point where it became profitable to feed for full production.

(4) Under this heavy feeding, which began to hit its stride early in the summer of 1942, inventories of certain classes of feed, like oil meals, distillers' grains and meat scraps, were fed up faster than the country was producing them. This heavy feeding during the summer of 1942 consumed feeds normally carried in inventory into the next feeding season.

(5) In spite of very large crops, particularly of soybeans this past season, beginning in November, this country found itself seriously short of the following classes of feed: (a) vegetable protein, (b) meat scrap and fish meal, (c) high-vitamin-carrying feed ingredients like dried skim milk, dried whey, and riboflavin concentrates, and (d) phosphorous carriers, such as steamed bone meal.

(6) I am told that a normal hog kill in this country is 60 to 65 million head. Last year, this country killed over 100 million, and this year has set a goal of 125 million.

As a result of this policy, the corn belt is demanding protein in quantities that cannot be supplied. This whole situation is more confounded because the government, in promoting a large soybean crop, has found that it inadvertently froze the price of soybean meal so low that it amounts to a bargain sale every time a car comes on the market. It is cheaper per ton than corn or oats, although almost four times as high in protein, and this in a short protein market.

Why a Shortage

Through no fault of its own, the feed industry, retail dealers, small mixers, and large mixers found themselves, so to speak, over a barrel. When the processors of meat scrap, fish meal, soybean meal and distillers grains and other such concerns filled their usual contracts with the millers and the dealers, the demand beyond this was so great, that they suddenly found themselves out of the market because of no supplies. The feed manufacturer and the dealer were not to blame for the shortage which suddenly showed up. Feed processing plants all over the country were so short of materials that they were unable even to come close to filling the orders that came in from day to day.

In order to meet the situation, the feed industry formed a committee and made an investigation. The writer happened to be chairman of this committee. Its investigation showed a 20 per cent shortage of supplying the high-protein feeds needed by farmers to meet their food goals. It also disclosed a great shortage of high-riboflavin carriers and of phosphorous needed to supplement vegetable proteins because of the short supply of animal and marine proteins, which had to be replaced by vegetable proteins, largely soybean meal.

Finally, as a result of this committee's investigation, the industry itself formed an industry council and has worked out a conservation program which it will attempt to have adopted by every feed manufacturer, large and small, and every retail dealer and every farmer in the country on a voluntary basis. This program has the approval of the Department of Agriculture and the cooperation of the Department in carrying it out. Roughly, it is as follows:

1. Use of *animal protein* — from such sources as meat scrap, fish meal, tankage liver meal, dried milk products — is to be restricted to 2 per cent in chick starter and broiler mashes; 2¼ per cent in growing and laying mashes that are fed with grain, 4½ per cent in breeder mashes; 2 per cent in sow and pig feeds that are to be fed straight; 3 per cent in calf starters that are to be fed straight.

2. *Vegetable proteins* will be conserved by limiting the protein content of dairy feeds to a maximum of 18 per cent, with 12 per cent to 16 per cent feeds recommended for feeding with good legume hay.

There is no question in the writer's mind but that perhaps as early as the winter of 1943, the national policy of trying to feed the world on the highest quality foods known as the animal products, will have to undergo a change. I think this is true even if we should be fortunate enough to again raise an above normal crop of feeding grains. Even at present, we have had to supplement our feeding program with large quantities of wheat, which under ordinary circumstances is a bread grain rather than a livestock feed.

The individual farmer may wonder what his own program should be in the face of probable shortages in the not too distant future of the kind of feed that he needs for high production. It seems to the writer that relatively high prices for animals for meat are likely to continue for some time. Any liquidation of livestock population as far as the individual farmer is concerned, will therefore be on a paying basis because he will be able to sell his animals for high meat prices. It appears to the writer also that if it is necessary to liquidate, the liquidation would be more apt to come first in meat animals like hogs.

Because there are normal stocks of feeding materials already on hand, the best program for poultrymen and dairymen will be to plan to continue with their present plans for high production. If next fall, after harvest there is not enough feed in sight to maintain a high national feeding level, there still will be sufficient feed to finish the animals off for the meat block on a paying basis.

— Courtesy Westernews

Men in the feeds industry are going all out to make available supplies reach. Above, Walter C. Berger, Des Moines Oats Products Co., a member of the Council, addresses a meeting in Sioux City, Iowa. Other speakers are (left to right): Chris Miller, Sargent & Co., Des Moines; Howard Boeke, State Sales Co., Des Moines; Russ Jensen, Corn Belt Supply Co., Sioux City; and Mark G. Thornburg, new secretary of the Western Grain & Feed Association, Des Moines.

TEST ALL BEAN SEED

TEST soybean seed to be planted this spring! With beans in the front rank as a war crop, we can't be taking chances. Much seed is showing up that is of low germinating quality. State seed laboratories are very busy this winter. Many farmers will have to test their own seed.

Pure seed is important also. There is little point in planting an early variety if it contains a mixture of five to ten percent of some late variety, since the late maturing beans will delay combining the whole field.

A rather tight seed situation is developing in Iowa. Less than 10 percent of seed tested at the state laboratory has shown a germination of more than 85, and perhaps half of the samples run have been unfit to plant. Iowa farmers may have to plant seed of lower germinating quality than is generally considered advisable. If this is done, more seed per acre should be planted in order to get a good stand.

In Illinois, tests are running higher, with 41 percent in February showing 80 or above, but there are many poor lots. Supplies of seed in central, south central and southern Illinois are believed to be ample to take care of most of the needs of the state, says J. C. Hackleman, Extension Agronomist of the University of Illinois.

The situation is better in Indiana, where soybeans are showing a higher average germination than they did last year, according to D. M. Doty, acting state seed commissioner. More than half of the samples tested range between 80 and 90. In Ohio, germination is the worst it has been since 1939, it is reported.

Farmers who test their own soybeans should read the germination tests critically. Any weak, diseased or deformed sprouts should not be counted as having germinated, because these abnormal sprouts haven't a chance to survive under average field conditions. These cannot all be picked out in less than seven-day test under favorable growth conditions.

Growers otherwise unable to obtain seed beans, may fall back on CCC stocks now in bins and country warehouses. These can be purchased at not higher than $2.50 per bushel, and must germinate at least 80 percent. But this seed should be bought only if no other source of supply is available. There is no guarantee of seed purity. Farmers who plant mixed lots that turn out to have a variation of several weeks in maturity will run into trouble next fall. They will have to delay harvesting until the late variety is ripe and risk having the early beans shatter in warm and humid weather.

County agents, seed dealers and growers can all help improve the situation by reporting satisfactory seed in their territories.

DUNFIELDS IN KANSAS Dunfield soybeans, relatively new in Kansas, outyielded every other variety in combine-harvested, state-wide tests conducted during 1940, 1941 and 1942, says Kansas Farmer. The 3-year average yield for Dunfield beans in all tests was 17 bushels to the acre; Hongkong ranked second with an average of 16.5 bushels, while A. K. was third with 16.1 bushels.

— USDA Photo by Forsythe

★ GROWERS ★

LIMED SOIL BEST FOR BEANS Soybeans do best on soil that is not acid, advises E. E. Barnes, associate in Agronomy at the Ohio Agricultural Experiment Station. When they were first introduced to American agriculture, the claim was generally made that soybeans were little affected by soil reaction. Experiments have shown, however, that they grow their best on well-limed soil, whether they are to be used for hay or for grain.

Liming the soil at the time the beans are planted has been much less effective than applying the lime at least a year before sowing the beans. In 1936, in one experiment, the effect of applying 2 tons of limestone at the time of planting was to increase the yield 4 bushels. The next year the same land was again sown to soybeans, and no further liming was done. The increase due to liming was 8.6 bushels the second year. For best effect, therefore, the lime should be applied the year before sowing the land to beans, or at least as near this long before as possible.

Efforts to increase the effectiveness of lime applied at planting time by concentrating it close to the soybean seed have been ineffective. Best results are obtained when the lime is placed so that it will neutralize the whole furrow slice. This requires mixing the lime thoroughly with the whole surface long enough ahead of planting the beans that the neutralizing reaction can complete itself before the beans start growing.

KEEP BEANS WEED FREE Thousands of farmers had their spirits dampened last year as far as growing soybeans is concerned. But most of such disappointing results can be avoided by correcting combinations of little errors.

Iowa State College crop specialists say the most important thing to remember is that beans and weeds cannot be grown on the same ground at the same time.

In addition, a new producer seldom plants his beans on his best soil, having heard that the soybean is a legume capable of pulling plant nutrients out of thin air — an obvious illusion.

Milk from soybeans can be used in making breads, cakes, creaming vegetables, milk chocolate and custards.

VIRGINIA BEAN COSTS The Agricultural Economics Department of the Virginia Agricultural College, assisted 20 farmers in keeping cost records on 125 acres of soybeans grown for oil, during the 1942 season.

Table shows an analysis of these records as to the costs and returns per acre on the average when broadcast or seeded in rows. Man labor was charged at 30 cents per hour, horse work at 20 cents per hour, tractor use at 75 cents per hour and machinery use at 10 cents per hour. The returns per hour of man labor averaged 85 cents.

COST PER ACRE OF PRODUCING SOYBEANS FOR OIL IN CERTAIN VIRGINIA COUNTIES IN 1942

	Broadcast	Rows	Mecklenburg Broadcast Hrs.	Mecklenburg Broadcast	Mecklenburg Rows Hrs.	Mecklenburg Rows	Prince Edward Broadcast Hrs.	Prince Edward Broadcast	Prince Edward Rows Hrs.	Prince Edward Rows	Isle of Wight Rows Hrs.	Isle of Wight Rows
Growing Costs												
Man labor	$ 1.94	$ 2.95	7.4	$2.23	2.6	$7.68	6.1	$1.83	15.1	$4.62	5.5	$1.71
Horse labor	2.10	1.94	10.9	2.19	3.8	7.60	10.3	2.06	22.1	4.42	1.6	.31
Tractor use	1.55	2.04	1.9	1.41	—	—	2.1	1.61	.7	.50	3.8	2.85
Machinery	1.02	1.04	12.8	1.28	3.8	3.80	9.1	.91		1.38	5.3	.54
Truck costs	.01	.03	.7	.06	3.4	.27		—		—		—
Seed	3.37	1.63		3.53		2.15		3.30		1.96		1.45
Fertilizer	2.31	2.64		2.55		2.98		2.21		2.91		2.51
Inoc.	.13	.04		.10		.14		.14		.10		—
Other	—	.04		—		—		—		—		.06
Total Growing Costs	$12.43	$12.35		$13.35		$24.62		$12.06		$15.89		$9.43
Harvesting Costs												
Man labor	$ .54	$ .22	2.9	$ .87	3.2	$ .96	1.4	$ .41		$ .20	.4	$ .13
Horse labor	.21	.11	6	.13	3.2	.64	1.2	.23		.07	.2	.05
Tractor use	.41	—	1.1	.82		—	.3	.25		—		—
Combine	2.37	4.13		2.17		4.85		2.46		4.00		4.07
Truck	.18	.43		.17		.70		.19		.26		.45
Other	.29	.32		.10		—		.36		.37		.35
Total Harvest Costs	4.00	5.21		4.26		7.15		3.90		4.90		5.05
Land use costs	5.83	6.00		5.41		6.00		6.00		6.00		6.00
Total Costs	$22.26	$23.56		$23.02		$37.77		$21.96		$26.79		$20.48
Income:												
Grain (bu.)	$17.30	$19.04		$16.58		$17.10		17.58		23.33		17.86
Value per bu.	1.55	1.55		1.55		1.55		1.55		1.55		1.55
Total value	$26.81	$29.51		$25.70		$26.50		$27.24		$36.16		$27.68

Lick Fall Weather With

EARLY VARIETIES, PLANTING

EARLIER maturing varieties and earlier planting in some areas are recommended by agronomists in the northern part of the soybean belt in order to avoid a repetition of last fall's bitter experience when early freezes caught many beans immature and rain and snow found many fields unharvested. Twenty-five million bushels remained in fields January 1, according to the Crop Reporting Board of the USDA.

Experiment station men emphasize that September and October are the months for combining beans, November for picking corn, and that if beans are out of the road before corn picking begins much grief will be avoided. That means early varieties.

Ohio Discussion

In Ohio, farmers, soybean processors, and staff members from the Ohio Experiment Station and the Ohio State University discussing Ohio soybean production in 1943 agreed that a wise choice of varieties to plant and the placement of early orders for seed will avoid some of the difficulties experienced in 1942.

D. F. Beard, agronomy specialist, Ohio State University, reports the varieties especially recommended at the meeting for use in northern Ohio were Wisconsin 606, Richland and Mingo. Those varieties are high in oil content, and do not lodge readily. However, he warns southern Ohio farmers against flocking to too early varieties. He says such action is not only going to drain the seed of early varieties out of northern Ohio where it should be kept, but also will give growers in the southern part of the state earlier beans than they really need, with resultant lower yields. For southern Ohio ~Beard recommends Dunfield and Scioto.

The men attending the University meeting advise planting 1943 soybeans in rows, which decreases the amount of seed required and increases the yield per acre, but also increases the labor needed to produce an acre. In view of the present seed and labor situation, it was decided that high production per acre was more advisable than an expanding acreage.

Planting early maturing soybeans will permit a longer harvest season during favorable weather. Thousands of Ohio farmers were unable to gather at least a part of their 1942 soybean crop because the beans ripened late, and rains made harvesting impossible soon after the beans matured.

Iowa Recommendations

Following are the recommendations by H. D. Hughes and C. R. Weber of the Iowa Experiment Station, in Farm Science Reporter, for Iowa:

1. Richland soybeans will give best results in the northern two or three tiers of counties. The Mukden and Manchu varieties are recommended for growers in north central Iowa and Illini and Dunfield are perhaps the best adapted varieties for southern Iowa.

2. The highest yields are obtained from planting in rows 20 to 30 inches apart, although there is no advantage to this method unless the beans are cultivated. Rows of varied widths can be obtained by using a drill and stopping up part of the holes. Farmers without a drill can get a 21-inch row by doubling back with their corn planter. Plant in rows as close as possible to enable cultivation with the available machinery.

3. One bushel per acre of GOOD seed is the rate to plant medium-width rows spaced from 21 to 36 inches apart. Narrow rows drilled 7 inches apart require 2 bushels per acre, while wide, 42-inch rows require slightly less than 1 bushel — deduct 5 to 15 pounds. Seed planted at these rates must germinate 90 percent or better and must be free of sticks, stones and cracked beans, etc. If the seed germinates only 50 percent, twice as much should be planted.

4. Plant from May 10 to 25 if grown in rows but delay seeding until May 25 to May 31 if drilled solid in order to kill as many weeds as possible before planting.

In Indiana

The importance of early harvesting to get soybeans out of the way before corn is especially stressed by K. E. Beeson, Extension Agronomist at Purdue University, Indiana. "It is increasingly evident that with large acreages of corn, corn picking will get under way in early November, says Professor Beeson. "In any case a day of combining in September accomplishes as much probably as two days in October, and a day in October accomplishes as much in saving soybeans probably as five days in November on the average."

K. E. BEESON

"Any delays increase the costs of harvest and the hazards of loss. The big soybean acreage in prospect and the limited man and machine power make it highly important that farmers use earlier maturing varieties wherever possible."

Southern Indiana farmers will find an advantage in the new Gibson, Patoka, and Chief which will mature very uniformly. These are fall season varieties, and for delayed planting in June or early July in that section of the state, the Richland has proven very satisfactory. Varietal mixtures contributed to delays in harvesting in 1942. This trouble can be overcome by the use of certified seed containing not to exceed one-half percent varietal mixture.

Row seedings hasten drying in the fall, and on rich fertile soils will reduce the lodging, and permit earlier combining than solid seedings. Fields must be free of seeds to give this advantage, and rowed seedings will have to be given row cultivations in most cases following one or two workings with the rotary hoe.

Illinois Situation

The corn borer may also operate to shift bean planting dates ahead in sections where it is a menace, as entomologists are recommending late planting of corn as a control measure. This will probably mean planting beans ahead of corn instead of vice versa as has been the practice in the past.

In 1942, varieties of medium maturity, such as Illini, Dunfield, and Manchu, failed to mature normally in northern Illinois, and many growers are anxious to get an earlier variety or strain. "We believe that Illini and Dunfield will be satisfactory, at least as far north as LaSalle," says J. C. Hackleman, Extension Agronomist of the University of Illinois. Many have grown these varieties successfully for several years well north of that line. Beyond the Rock Island-Joliet line, varieties to be considered are Richland, which is particularly good on high fertility levels, and Mukden, which is not quite as early as Richland but about five days earlier than Dunfield and Illini, and which will be found very satisfactory, particularly on the average land.

Mandell — An early selection of Manchu can be used along with the Wisconsin selections of Manchu, Wisconsin 3 and Wisconsin 606. In central and south central Illinois, the standard varieties, Illini and Dunfield, will still continue to be recommended and used extensively.

Chief — Because of unusual weather conditions throughout 1942 and the use of this variety *farther north than had ever been recommended*, the results were somewhat disappointing. North central Illinois farmers should be warned against a variety that is as late as the Chief unless they can get the seed in early and have soil that is likely to hasten the maturity (that is, sandy types). In central, south central, and southern Illinois, the Chief is still an excellent bean and will be in great demand. Missouri is anxious to obtain large quantities of seed of this variety, and the same is true in the east, where the Chief has proved to be one of the most resistant soybeans to the Japanese beetle.

Mansoy and Scioto — Two late selections of Manchu will still be used and found quite satisfactory.

Macoupin — Another medium-late-maturing bean which is adapted to growing south of a line drawn across Illinois through Mattoon, Taylorville, and Pittsfield. This variety has proved quite satisfactory in southern Illinois, Missouri, Kentucky, Tennessee, and parts of Arkansas and Mississippi.

Mt. Carmel and Patoka — Other soybean varieties for south central and southern Illinois. These varieties are indistinguishable in plant and seed characters.

Gibson — Another high-yielding yellow variety recently released from Indiana; has plant characters much like the Chief.

EARLY SOYS BEST IN MINN.

— Early maturity soybeans proved to be the best yielders in 1942 in west central Minnesota, reports John W. Evans of Montevideo, Minn. Growers who had the Habaros, early Manchu and the short stalk Minsoys received from 15 to 20 bushels to the acre of bright colored beans. Those who had Mukden, Richland and later strains of Manchus had to accept yields of 10 to 12 bushels per acre of frost damaged beans.

U. S. D. A. LOAN AND PURCHASE PROGRAM

A loan and purchase program supporting prices to farmers on 1943-crop soybeans has been announced by the U. S. Department of Agriculture. The base loan and purchase rate on No. 2 yellow soybeans with 14 percent moisture is $1.70 per bushel. Premiums for low moisture and discounts for other quality factors result in prices from $1.75 to $1.57 for green and yellow soybeans of other grades and moisture content. The base rate on 1942-crop soybeans was $1.60 a bushel with discounts for other grades but no premium for low moisture content. Loans will be made by the Commodity Credit Corporation acting through county committees of the Agricultural Adjustment Agency.

Farmers participating in the program must plant not less than 90 percent of their war crop goal. To be eligible for loan, soybeans must grade No. 4 or better with respect to factors other than moisture and have a moisture content of not more than 14 percent. Soybeans grading weevily or which are musty, sour, heating, or which have any objectionable foreign odor, shall not be eligible for loan.

Loans will be made through January 1, 1944, and will mature on demand but in no event later than April 30, 1944. Consent for the storage of soybeans on farms until July 1, 1944 will be required. A storage allowance of seven cents a bushel will be advanced at the time a loan is completed and will be included in the amount of the note. Should the borrower fail to store the soybeans until April 30, 1944 (except for the calling of loans), a refund of 1 to 5 cents per bushel, depending upon date of termination of storage, will be required of the borrower.

—s b d—

STOP TRADE IN BEAN FUTURES

Following the Commodity Credit Corporation order prohibiting purchase of 1942 crop soybeans except by processor, manufacturer or seed dealer, the Chicago Board of Trade discontinued trading in soybean futures at the close of business February 19.

The Board of Trade charged that the CCC order nullified the "specific order of Congress as expressed in the Emergency Price Control act of 1942," and that it did "not serve the best interests of the nation and its present war effort.

"It is true," said a Board's Executive Committee statement, "that the Secretary of Agriculture, in his order, did not specifically prohibit future trading in soybeans but as a matter of fact he did prohibit dealing in contracts for the future delivery of soybeans because he restricted purchasers of soybeans or soybean contracts to three classes of persons, namely, processors, manufacturers and seed dealers."

William McArthur, Director of the Grain Division, Commodity Credit Corporation, states, concerning the Board's action, "A large production of soybeans is essential to the war effort. It is our position that any steps necessary to secure this production must be taken, even though they may cause dislocations such as the elimination of all practical functions of the market in soybean futures. We believe that the soybean futures market is unnecessary under present conditions."

—s b d—

ADVOCATES TWO DOLLAR BEANS

Scrapping the farm parity principle and adjustment of prices to bring farm production into line to meet the food crisis are recommendations of Dr. T. W. Schultz, head of the Department of Economics and Sociology at Iowa State College.

The parity formula results in too high a price for wheat, too low a price for soybeans, too much cotton in the South, too few soybeans and peanuts in that region, believes Dr. Schultz. He says the farm price of soybeans should be at least $2.00 a bushel.

Quoting Dr. Schultz in the January-February *Iowa Farm Economist:* "With our large stocks of short staple cotton there is no justification for going ahead and producing still another crop. What we need is food — peanuts, soybeans, and sweet potatoes. The job of putting the South on a war basis will call for as drastic a change as the automobile industry undertook late in 1941.

"It is going to be very difficult to get soybeans up next year with AAA restrictions on corn removed. It will take a larger price incentive — certainly not less than $2 per bushel on farms. Supplementary measures are also called for.

"We should shift sharply towards cereals and potatoes in our diets. We must favor those foods which reduce manpower requirements in agriculture. It is our good fortune to have large reserves of wheat. Potatoes can be expanded rapidly. Soybean flour, meal, and grits rate high as foods and their consumption should be promoted, especially to replace wherever possible animal proteins because of the shortages in meats."

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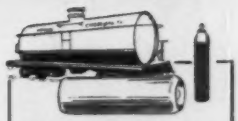

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★ SOYBEANS . . . and People ★

SOY FLOUR RECIPES

COOKS who are worried these days about extending the meat can do no better than to use liberal amounts of soy flour in their recipes. Try adding some to the meat loaf, to gravy, to all sorts of baked goods. There are several good refined soybean flours on the market, most of which taste and behave very much alike. When substituted for part of the wheat flour in ordinary recipes soy flour has the advantage of giving a moist product which keeps fresh a long time on account of the extra moisture which can be added with the soybean flour. It also improves the crust of breads and causes them to toast even better than usual.

Only a small amount of soy flour can be used in yeast bread without changing its texture beyond acceptability. More can be used in "quick" breads made with baking powder. Soy flour cannot be used alone in ordinary recipes, because it has no gluten or starch to bind the mixture together.

Soy crackers enhance the flavor of soup.

Soy flour, like wheat flour, should be sifted before it is measured. One cupful of soy flour weighs about 75 grams, whereas one cupful of soft wheat flour weighs 100 grams and one cupful of hard wheat flour weighs 113 grams.

The following recipes are taken from the leaflet, "Ways of Using Soybeans as Food," issued by the Extension Service of the University of Illinois College of Agriculture, Urbana, Ill. Soy food cooks can do no better than to write for this leaflet. It contains a number of very good recipes.

Griddle Cakes

½ c soy flour	½ t salt
1½ c white flour	2 eggs
2 t sugar	1¾ c milk
4 t baking powder	2 T fat

To the sifted dry ingredients add a mixture of beaten eggs, milk, and melted fat. Bake as small cakes on a hot griddle. Serves 4 to 6 persons.

Pastry

2 c white flour	¾ c shortening
½ c soy flour	1 t salt
½ c cold water	

Sift the flours and salt. Chop the shortening into the flour and next add all the water at once. Mix lightly, work into a smooth ball, and roll out for 2 9-inch pie pans, using as little flour as possible on the board. Bake at 450 degrees F. Pie crust browns more quickly when made with part soy flour.

Nut Bread

2/3 c soy flour	3 t baking powder
1½ c white flour	1 egg, beaten
1/3 c sugar	2 T melted fat
½ t salt	1 c milk
½ c nuts	

To the sifted dry ingredients add a mixture of the egg, fat and milk. Stir in the nuts last and bake in a moderate oven (375 degrees F.). This loaf makes about 18-20 slices.

Drop Cookies

1¼ c soy flour	½ t salt
1¼ c white flour	½ c fat
½ t cinnamon	½ c brown sugar
½ t ginger	½ c molasses
1 t soda	½ c sour milk

Sift together the flours, spice, salt and soda. Cream the fat and sugar; combine the molasses and sour milk. Add the liquids and flour alternately to the creamed fat and sugar. Chill in the refrigerator for 3 to 4 hours. Drop by teaspoonfuls on a greased baking sheet and bake 15 minutes in a moderately slow oven (350 degrees F.). This amount makes 2 dozen cookies.

Soy Flour Wafers

½ c soy flour	1½ T milk
½ t salt	1½ ounce grated
1 egg yolk, beaten	cheese

Sift the flour and salt. Mix the beaten egg yolk with the milk and gradually add the liquid to the dry ingredients. Add the grated cheese and stir it evenly through the dough. Roll thin and cut into 2-inch squares. Bake in a moderate oven (350 degrees F.) until brown. Sprinkle with salt as soon as they are removed from the oven.

Tomato Soup

½ c strained tomatoes	2 T soy flour
½ c water	½ t salt

Add the strained tomatoes and water to the mixture of flour and salt. Mix well and heat. Boil for 10 to 15 minutes until the desired consistency is reached. This resembles a cream soup in consistency and flavor.

—s b d—

TEACHING AID ON SOYBEANS

An instructional aid for teachers of vocational agriculture, county agricultural agents, agricultural extension lecturers, agricultural college teachers, and soybean crop specialists has just been published. It is a 72-page bulletin and film strip on "SOYBEANS — Their Production, Improvement, and Utilization in Indiana" — co-authored by S. S. Cromer, Professor of Agricultural Education, Purdue University, G. H. Cutler, Professor of Agronomy, Purdue University, and W. J. Weber, Vocational Agriculture Teacher, North Terre Haute.

The bulletin is a syllabus for the film strip. It presents, in brief form, the technical agricultural information which should be known by the producer of soybeans. The learning objectives — or, what the farmer should know — are divided into four parts, namely: Part I — The Soybean Crop and Its Importance, Part II — How Adapted Varieties Are Made Available to the Farmer, Part III — Growing and Managing the Crop, Part IV — Utilization of the Soybean Crop. These objectives have been validated by means of the judgments of successful farmers, agricultural extension and research specialists, professors of agronomy, agricultural education specialists, and vocational agriculture teachers.

The film strip and bulletin have been produced with the aid of research techniques and methods not usually employed in the production of visual aids. It represents some pioneer work in the development of instructional aids for teachers of agriculture, both at the college level and below the college level. It will serve the needs of teachers of soybean production, especially in the corn-belt states, and will be of considerable aid for teachers in other states.

The bulletin and the film strip are for sale by Agricultural Extension, Purdue University, Lafayette, Ind.

★ FOREIGN ★

SOYBEANS IN ARGENTINE A recommendation by Savon Salaberry that the people in the northern part of the republic of Argentine cultivate soybeans in order to correct mineral and protein deficiencies in the general diet is reported in the Boletin of the Pan-American Sanitary Bureau.

Inoculation Used
A Thousand Years Ago

By DAVID G. WING
Mechanicsburg, Ohio

INOCULATION is not a new development or technique amongst soybean growers. In part I am sure that if you went back one thousand years you would find that the Chinese were in the habit of either planting on ground where beans had been raised before or were sprinkling their new seedings with soil from a field already inoculated.

One of my earliest memories of growing soybeans dates back to about 1910 when my father and uncles were raising beans for seed and hay. The varieties, such as Mikado, Mongol, Ito San and Sables are out of existence now but still we always even then carried soil from an old field in sacks to inoculate the new seedings. How I despised as a boy the sacking up of this soil for shipment to growers who wanted to do the right thing and get what few bacteria they could out of our old soybean fields. Early soybean enthusiasts drove many miles in those days to get their start of bacteria in this way.

Modern Methods

Then came the period of prepared inoculation made by grinding the nodules themselves taken from the roots of a soybean plant. This was practiced for several years and was quite successful until our modern laboratories learned to grow these same bacteria on suitable cultures by a very much more efficient process. This laboratory prepared bacteria is so cheap and easy to handle that it is hard to understand why there are still so many farmers who do not use them.

This last season we had in about 400 acres of soybeans in Ohio and Arkansas, all of which we inoculated before planting. Some of these fields had been in beans just the year before and yet we never take a chance on nature when prepared bacteria are so cheap and easy to use. Three years ago I planted a small field of beans very early. I inoculated the seed but a hard crust, weeds and frost gave me a poor stand, so the first of June I disced them up and planted them again. I did not inoculate the second time, thinking that there would be plenty of bacteria in the soil and on the few remaining plants to take care of my bacteria needs. I got a good stand of beans this time but all summer long that field was a nightmare to me when I looked at the few dark green, well-developed plants that were inoculated in comparison to the big percentage of plants which were yellow and never developed as they should. I think most of us can tell a field which has not been inoculated by its light green or yellowish color, as we drive by in a car. Experience is certainly the best teacher in growing soybeans, as well as in other ventures, but there is no excuse for any new grower not profiting by the older growers' advice as far as inoculation is concerned.

—s b d—

D. G. WING

CAYUGA SOYBEANS TO RUSSIA

Four bushels of Cayuga soybeans, a variety developed by Cornell University plant breeders, have been shipped to the Soviet Union through the Russian War Relief for trial plantings as a feed and food crop. Cool weather and short growing seasons in Russia resemble conditions of New York State. The Cayuga variety matures in any part of New York up to 1,600 or 1,800 feet elevation. Soybeans of the Corn Belt will not mature in New York or in the cool areas of Russia. The Cayuga's yield is from 20 to 25 bushels or more of dry beans to the acre. It may help to solve the food production problems of a Russia despoiled of her great grain-producing area in the Ukraine.

SHUEY & COMPANY
Chemists
Savannah, Ga.
Analysis of
SOYBEANS AND PRODUCTS
Official Chemists for National Soybean Processors Association

SOY-GRASS COOKIES
Wheatless — Sugarless — Alkaline
The Food Sensation of the Age
THE LAST WORD IN NUTRITION
3 pkgs. mailed postpaid anywhere in U. S. for $1.00
Ask for Recipe sheets and price lists of other soybean foods.
VEGETABLE PRODUCTS CO.
Dept. SD
480 E. Main St. ROCHESTER, N. Y.

Do You Have Your Copy?
SOYBEAN FOOD
Under One Cover
All papers on soy foods presented by the nation's leading authorities before the 22nd Annual Convention of the American Soybean Association, September, 1942. Illustrated 32-page booklet.
10c Each Postpaid
THE SOYBEAN DIGEST
HUDSON, IOWA

We Have No
Dannen's Soybean Oil Meal
For Sale
BUT you can get all the protein your stock and poultry need, plus vitamins and essential minerals when you ASK FOR DANNEN FEEDS at your local DANNEN DEALERS.

DANNEN MILLS
ST. JOSEPH, MO.

PERSONALITIES

IN Grant County, Indiana, near the thriving city of Marion is a 360-acre farm operated by Max Townsend and his "dad," M. Clifford Townsend. Their pride and joy is an 80-acre field of soybeans that was waist-high in August and flourishing like the proverbial bay tree.

These farmers were pioneers in that district in soybean raising, starting 18 years ago, and continuing to find the all-purpose legume a profitable crop.

Incidentally, M. Clifford Townsend was formerly governor of Indiana and is now director of the Food Production Administration in Washington, D. C. As such, the "governor," as he is still called by his friends, is advocating for American farmers in the war effort all of the things he practices on his own farm: soil conservation, crop rotation, increased and planned production — and more soybeans!

* * *

Photos show M. Clifford Townsend, FPA Director, (right) and his son Max in a section of their soybean field near Marion, Indiana.

—s b d—

CANADIAN NAVY RATION

(Continued from page 6)

sure that thirst was not induced by eating the ration, and finally the product assumed its finished form.

Over 200 tests were made, closely supervised by Mr. Calder, the efficient chemist of Clarks Foods, and as a check on the actual efficiency of the biscuit, tests covering months were repeatedly made on Albino and Steenbock rats.

The rats fed on the Ration Biscuit showed in some cases a superior gain of weight and in the balance an equivalent gain over the rats fed balanced diet, proving the ration biscuit a balanced diet in fact as well as in theory.

The biscuit was now ready to be produced commercially. Commercial samples were run and tested and latest official analysis reading roughly 160 grams carbohydrate, 150 grams protein and 150 grams fat. The caloric value is placed at 2,200 with a moisture content of 3.8, the estimated B_1 content around 700, and the balance mineral supplements.

Navy Interested

The Navy became interested in the biscuit last year when the new Emergency unit was under consideration, and the formula was made available to them. The biscuit is now standard equipment in that ration unit now being issued to the Canadian Navy, and we sincerely hope it may play some part in reducing the tragic toll of lives lost in ship sinkings.

The formula will also be available free to our armed forces and those of our allies. As one pound of ration biscuit is equal in food value to 10 pounds of the old hard tack its value as a weight and space saver should make it ideal for army emergency rations.

We have had many inquiries from doctors, nutritionists, as to when the biscuit will be available for general use in hospitals, etc., but there is little likelihood that any will be available until the war is over. We of course retain commercial rights and the biscuit will be released under the name "Soycrisp," just as soon as facilities for its manufacture are available.

This then is the little story of the ration biscuit, and the part soya played in its make-up. If it helps save one life or reduces the hardship our men suffer, we will have been amply repaid and the work of producing the ration will indeed, have been a labor of love.

—s b d—

W. A. Bogan, well known throughout the cottonseed products industry as a member of the firm of Lacey-Logan Company, Dallas, Texas, has joined the Commodity Credit Corporation staff in Dallas. He will handle the distribution of soybeans and soybean meal in the states of Arkansas, Louisiana, Texas and Oklahoma.

FIGHTING ACRES

America's 6 million farms spread over a half-billion acres.

Right now these are fighting acres.

They're feeding at least 7 million soldiers and sailors, each of whom eats nearly twice as much as the average civilian.

They're feeding America's 35 million families.

And to top all this, they've supplied 1¾ billion dollars worth of food to our lend-lease allies in the last 18 months.

Most of this produce was carried by the railroads to the ports—carried in addition to the vast movement of troops, military machines and other war goods.

To keep it all on the move, the railroads are starting off a heavily loaded freight train every four seconds—are hauling a million and a quarter tons of freight a mile every minute of the day and night.

In doing their job the railroads face pressing problems similar to the farmers'.

A lot of our men have joined the armed forces. We cannot get all the extra engines and cars the rush of work requires.

But just as the farmers are going all-out to produce everything they can, we'll do our level best to continue to carry everything they grow as swiftly and reliably as we always have.

UNITED FOR VICTORY

ASSOCIATION OF
AMERICAN RAILROADS
WASHINGTON, D. C.

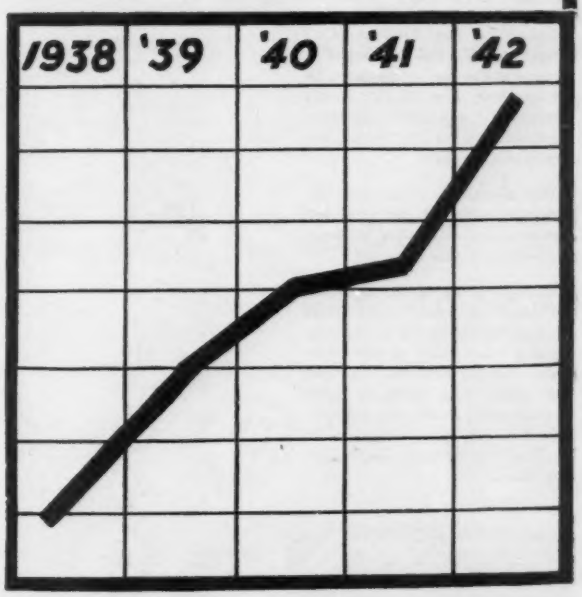
It's Important

TO ORDER YOUR SOYBEAN INOCULATOR.... *Now!*

HERE'S WHY Rush orders placed just a few days before planting, cannot be delivered this year. Material shortages, labor shortages, and transportation difficulties have slowed down deliveries tremendously. Play safe . . . Go to your dealer and place your order for Nod-O-Gen **now.**

Authorities

URGE . . . . inoculation of soybeans every year to insure proper nodulation. Check the recommendations of your association and your county agent on this point. And re member . . . no farm operation pays bigger returns for so little money, time, and labor as inoculation of soybean and other legume seeds.



NOD-O-GEN . . . the pre-tested inoculator has a great record of making friends among growers. The adjoining chart indicates the growth of Nod-O-Gen inoculator for soybeans. It suggests that you can, **with confidence,** recommend Nod-O-Gen to your neighbor as well as arrange for your supply **now.**

Farm Laboratory Division **THE ALBERT DICKINSON COMPANY** **Chicago** **Est. 1854**

NOD-O-GEN The Pre-Tested Inoculator
The Crop and Profit "Pepper Upper"

Meal Makes Best Pelts

— National Fur News Photo

Fox Feeding Experiments

FUR ranchers have been slow to adopt soybean oilmeal because of the belief that meat products should constitute the principal source of protein in the carnivore's diet.

However, a series of experiments conducted by Charles F. Bassett, director of the United States Fur Animal Experiment Station, Saratoga Springs, N. Y., should go a long way toward overcoming any prejudice that exists against soybean products. The station, in feeding the meal as a partial or complete substitute for raw meat in the silver fox ration, seems to prove that the meal can enter extensively into fur animal feeding with the best results.

Lower Cost

Mr. Bassett's experiments, which began in 1937, were conducted with large numbers of animals, during every season of the year, with adult fox males and females, weaned pups, suckling pups, and pregnant vixens.

Of these experiments Bassett writes: "Although the silver fox, like the dog, is a carnivore, the science of feeding foxes has progressed to the point where this animal can be fed a combination of cereals and soybean meal and will produce *superior* pelts at *approximately two-thirds of the cost* of pelts produced by foxes receiving rations containing 40 percent raw meat (the standard ration)."

Among the questions Mr. Bassett sought to answer with his experiments were whether soybeans in the ration would affect detrimentally the health of the animals, their fertility, the growth of the pups, and the condition of the pups.

He found rations containing soybean oil meal in the summer and fall feeding of vixens to be very satisfactory from the standpoint of health, food consumption, average liveweight, and fur production standard, and that they did not affect detrimentally the production of pups the following spring. The ration including the soybean substitute fed to the males also proved to be very satisfactory, and did not affect their fertility.

But the station's results in substituting soybean oilmeal for the raw meat in the fox pup ration are perhaps more significant. These experiments were carried on over a period of three years, with over 160 pups in all.

Although the pups receiving the meal did not make the gains nor did they during the experiment quite reach the size of those receiving meat, they produced pelts that were actually superior and preferred by the fur trade, on a ration 35 percent more economical than the raw meat ration!

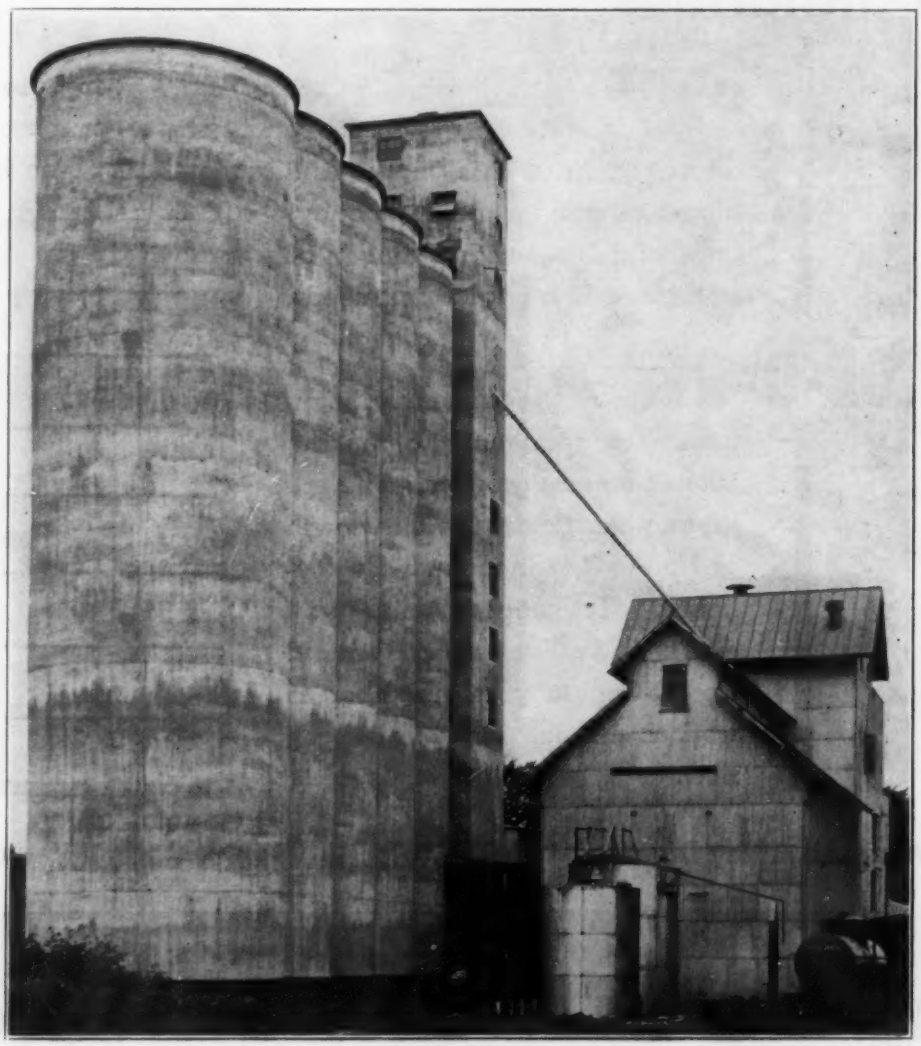
An expert found the pelts from meal-fed foxes superior in general appearance, size, fur coverage, sheen, and absence of tinge.

Breeding Vixens

The station has conducted experiments with vixens during the breeding, gestation and suckling periods, in which from one-half to all of the normal 40 percent raw meat in the diet was replaced by bean meal, beef meal and liver meal, with satisfactory results.

Mr. Bassett concludes, concerning his experiments: "I do not hesitate to recommend soybean meal as a partial substitute for raw meat in the year around fox ration, and as a complete substitute for raw meat during the summer, fall, and early winter. It is understood of course that such rations must be properly supplemented in order to make them nutritionally complete."

Photo courtesy Grain & Feed Journals, Consolidated



PLANT OF GALESBURG SOY PRODUCTS CO.

Galesburg Soy Products Co., Galesburg, Ill., has expanded its storage space for soybeans with the erection of a 215,000 bushel reinforced concrete elevator. Contractors were the Ryan Construction Company.

This elevator is adjacent to the company's 50,000 bu. cribbed elevator and 4-expeller soybean processing plant.

Storage space in the new and the old elevators will hold enough beans to keep the processing machinery of the company busy for 80 days. The mill can crush from 2,700 to 2,800 bushels daily. Primary machinery in the processing plant is four Anderson Super-Duo Expellers.

— USDA Photo by Peter Killian

SERVICE TO THE NATION'S FARMERS

- PIONEER SOYBEAN PROCESSORS
- FAMOUS *Funk Farms* FIELD SEEDS
- FUNK'S 'G' HYBRID SEED CORN

FUNK BROS. SEED CO.
BLOOMINGTON, ILLINOIS
FUNK FARMS ESTABLISHED 1824

RAT RUIN

Non-poisonous to humans or pets

Why allow rats to destroy poultry and foodstuffs? RAT-RUIN, a red squill product made according to U. S. Department of Agriculture formulas, will eliminate 90% of that loss.

TRIAL BOX... $1.00

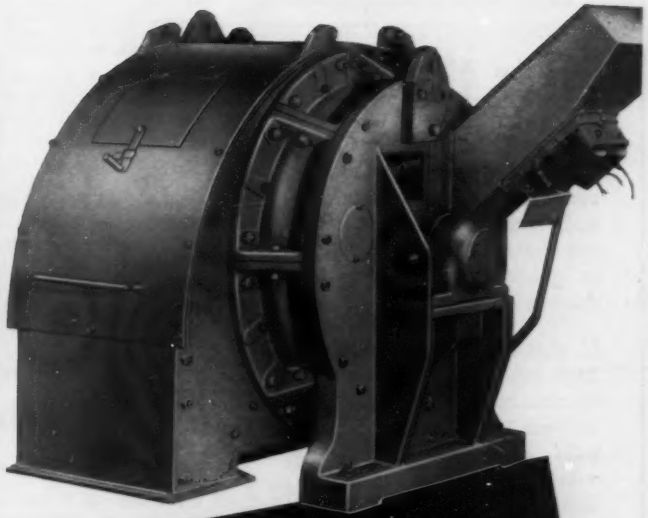
Enough to Kill 200 Rats Postpaid

Also packed in bushel, half bushel, and one-fourth bushel baskets for quantity users. Write for prices.

Address Orders and Inquiries to

Dept. FH —The Soybean Digest
Hudson, Iowa

NO MUSS--- READY TO USE



PRIOR KNOWLEDGE *of* SOY BEAN *Grinding Problems*

When you call on Prater Grinding Service you get combined experience, unparalleled in industry, today.

The problems of grinding soy beans, in every part of the country, have been met and solved.

This wide experience is coupled with the specialized development of Prater Dual Screen Grinders for grinding of soy beans.

Knowledge and **equipment** make the Prater Grinder the leader, by far, in number and success of installations.

PRATER PULVERIZER COMPANY,
1825 S. 55th Ave., Chicago, Ill.

Please send me information on Dual Screen Grinders covering the Soybean industry.

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Address.....

City..... State.....

Mail Today

Prater PULVERIZER CO.
1825 S. 55th Ave.
CHICAGO · ILLINOIS

After the War

When victory comes, Neff & Fry will again be able to serve all the regular markets as in time past. Today, however, our entire production is going to high priority customers.

If you can furnish such a high priority, we invite you to consider the advantages of Neff & Fry bins — sturdiness, cleanliness, and convenience. Stave or monolithic concrete construction. New 1943 catalog just off the press.

THE NEFF & FRY CO.

CAMDEN, OHIO

NEFF & FRY STORAGE BINS

CHEMURGISTS IN CHICAGO

A Soybean Dinner and Roundtable presided over by "Soybean" Johnson of Ralston-Purina Company will be one of the features of the ninth annual Chemurgic Conference to be held in Chicago March 24 and 25.

"Chemurgy in War" is the theme of the conference this year, with sessions on rubber, alcohol, fiber, plastics and fats and oils.

The soybean session is at 6:00 p.m. the 25th, and is followed by a program on new crops presided over by David G. Wing, president of the American Soybean Association.

Seed Directory

A charge of $1 has been made for listing in the February, March and April issues. Listings for the April issue can be made for 50c. Quantity for sale and variety are included.

OHIO

Eaton — Mason Montgomery's Sons, 220 bushels registered Richlands, 200 bushels registered Dunfields, 500 bushels registered Sciotos.

Hillsboro — A. R. Kinzer, 100 bushels Illini, 100 bushels Chief, 100 bushels certified Dunfield.

Ada — J. R. Spar, 300 bushels registered Dunfields, also Ohio Certified Hybrid Corn.

IOWA

Boone — Roscoe Marsden, Rt. No. 1, 700 bushels certified Richland, germination 90 percent.

Hudson — Strayer Seed Farms, 500 bushels Richland, 1,000 bushels Mukden, 200 bushels Kingwa, 300 bushels Mandell.

Marcus — John Sand, 2,000 bushels certified Richland, 2,000 uncertified Richland, 300 bushels Mandell.

INDIANA

Knightstown — R. Cannell, Mgr. Hackleman Farms, 300 bushels certified Chief, 150 bushels Richland, 200 bushels Illini.

Hobart — Roland W. Miller, 400 bushels blue tag Dunfields.

ILLINOIS

Champaign — Seeber Bros., Graded and certified Chief, 85% germination, 99.8% purity in bags ready for planting.

Are You Keeping Up

. . . with the latest developments in your field? Here's a group of magazines that **specialize** in a particular subject! You'll be interested in at least **one** of these magazines . . . and you have the assurance that the articles are written by people who **know**. Send in your subscriptions today!

Bee Magazines
Gleanings in Bee Culture, $1 per year
Beekeepers Item, $1
American Bee Journal, $1

Farming
The Country Book, quarterly, $1
American Farm Youth, 75c
Fletcher's Farming, 50c

Goats
American Dairy Goat News, $1
Goat World, $2 (6 months $1)

Livestock
The Cattleman, $1
American Cattle Producer, $1
Florida Cattleman, $1
National Live Stock Producer, 50c
Texas Live Stock Journal, $1
Eastern Breeder, $2 (8 months $1)
Hog Breeder (all breeds), $1
Amer. Hamp. (hog) Herdsman, $1
Sheep (and Karakul) Breeder, $1
The Sheepman, $1
New Mexico Stockman, $1

Pigeons
American Pigeon Journal, squab-fancy, $1.50
Pigeon News, fancy only, $1.50

Poultry
Cackle & Crow, The Poultrypaper, $1
Pacific Poultryman, 50c
Florida Poultryman, 50c
New Hamp. Breeder, quarterly, 3 yrs. $1
Bantam Magazine, $1
Northeastern Poultryman, 2 yrs., 24 issues, $1

Rabbits
Small Stock (rabbits, cavies exclusively), $1
American Rabbit Journal, $1

Other Specialties
Organic Farming, $2 (6 mo. $1)
Dairy Farmers Digest, $1
Eastern Fruit Grower, $1
The Soybean Digest, $1.50
New Agriculture (sugar beets only), $2
American Fur Breeder (mink, etc.), $1
Small Commercial Animals & Fowls, 50c

All magazines are monthlies except where otherwise noted; prices are for one full year. Satisfaction guaranteed. All orders are handled promptly and acknowledged. Rush your subscriptions today. Remit in any manner convenient to you.

MAGAZINE MART

Dept. SD **LaGrange, Ill.**

Sample copies at single copy prices.

DON'T WAIT to order your Steinlite

STEINLITE . . . one-minute Moisture Tester

. . . one-minute Moisture Tester. Order now — you don't even need a priority — you get prompt delivery. Wait . . . and be "out of luck." This is "slack season" for manufacturing moisture testers, May, June, and July are rush months. Due to war conditions, fast deliveries on orders placed during the rush will be impossible. So . . . if you expect to need a Steinlite for '43 crops . . . BY ALL MEANS ORDER IT NOW.

"HEADQUARTERS" for Triers, Sieves, Scales . . . all grain and seed Testing Equipment

SEEDBURO EQUIPMENT COMPANY

629 BROOKS BLDG.
CHICAGO, ILLINOIS

TRADE NEWS

STANDARD SHORTENING SHIPMENTS

By Members of Institute of Shortening Mfgs., Inc.

Week ending February 6, lbs.....15,220.128
Week ending February 13.....13,265,118
Week ending February 20.....10,578,257
Week ending February 27.....10,529,847

Week of February 6 included some navy shipments.

● **STOCKS OF SOYBEANS.** Stocks of soybeans in interior mills, elevators and warehouses on January 1 were 27,193,000 bushels according to a special survey made by the Crop Reporting Board of the U. S. Department of Agriculture. Soybean holdings in interior mills, elevators and warehouses on July 1, 1942 approximated 2,400,000 bushels and on October 1, 1942 were 1,192,000 bushels. Of the January 1, 1943 stocks of 27,193,000 bushels, 92 percent were located in the four States of Ohio, Indiana, Illinois and Iowa, with Illinois alone accounting for 17 million bushels. These stocks do not include 13,500,000 bushels of soybeans reported as owned by the Commodity Credit Corporation on December 31, 1942, and stored off farms in its own steel and wooden bins.

Stocks of Soybeans in Interior Mills, Elevators and Warehouses, With 1942 Production of Soybeans

(000 bushels)

State	1942 Production	Jan. 1, 1943 stocks	State	1942 Production	Jan. 1, 1943 stocks
Ohio	28,819	1,900	N. Carolina	3,900	250
Indiana	29,757	2,150	Mississippi	2,842	120
Illinois	73,794	17,000	Arkansas	3,585	140
Michigan	3,740	50	10 principal States	196,798	24,066
Minnesota	3,549	271	OTHER STATES	12,761	1,127
Iowa	39,312	3,865	U. S.	209,559	27,193
Missouri	7,500	320			

The Bureau of the Census reports that soybean stocks in all mills engaged in crushing soybeans amounted to 34,938,000 bushels on January 1, 1943, as compared to 19,238,000 bushels a year earlier. Stocks in crushing mills last October 1 totaled 1,120,000 bushels.

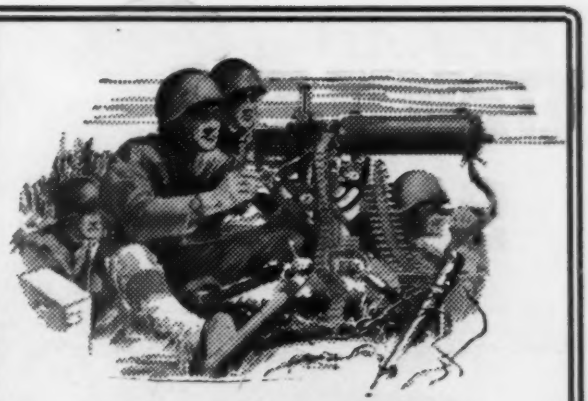
In addition to stocks reported in the above four positions, the Crop Reporting Board estimated that soybean stocks on farms amounted to 99,046,000 bushels on January 1, 1943. Combined stocks of soybeans reported for the five positions totals 177,915,000 bushels. These stocks, together with the crushings of 25,096,000 bushels from October 1 to December 31, 1942, as reported by the Bureau of the Census, account for 203,010,000 bushels of soybeans out of a total supply of 215,959,000 bushels. (1942 production of 209,559,000 bushels plus an estimated carry-over of 6,400,000 bushels of old beans.) This leaves only 12,949,000 bushels to cover soybeans in transit on January 1, soybeans forced by shortage of storage space into unusual positions not reporting, and soybeans fed to livestock before January 1.

Of the January 1, 1943 farm stocks of soybeans, about 25 million bushels remained unharvested on that date, according to information available to the Crop Reporting Board. This is a result of a combination of factors including continued snow cover or other unfavorable harvesting weather from late November through January 1, congestion in the marketing and storage facilities which necessitated delay in harvesting, lack of available harvesting equipment in some areas, and the necessity of delaying harvest of some beans that were immature at the time of the heavy freeze in late September. Most of the unharvested beans are in an area centering in northern and central Illinois and extending east across northern Indiana into northwest Ohio and southern Michigan and west into northeastern Iowa.

● **LID ON SOYBEANS.** The Office of Price Administration issued February 27 a maximum price regulation on soybeans, covering sales of this previously uncontrolled raw agricultural commodity from farmer to processor.

The maximum will be $1.66 per bushel on top grades of soybeans when sold by farmers to country elevators and slightly higher maximums will be permitted for sales at later stages of distribution. The regulation is designed to encourage farmers to move soybeans promptly in order to make more oil and oil meal available immediately.

The new ceiling prices, applicable only to raw and unprocessed soybeans from 1942 and previous crops and exempting from price control soybeans sold for seeding in 1943, are slightly higher than recent transactions in the cash market and compares with an average of 89 cents per bushel secured by farmers during the 1940-1 season.



SOYBEAN
WEAPON OF WAR

There's not a branch of the service where the soybean is not playing a vital role. But in war as in peace its chief purpose remains that of supplying the nation's livestock with soybean oilmeal. Farmers are asked to break all records in the production of meat, milk and eggs in 1943, even last year's records! That means rations better balanced — and more soybean oilmeal.

Decatur Soy Products Company

OLD PROCESS — EXPELLER TYPE

DECATUR, ILLINOIS

Sole Manufacturers
Patented

NU-SEME
BURLAP AND COTTON BAGS

The best substitute for new bags.

Also good quality second-hand bags.

ALWAYS
a good source of supply for bags.

During the war and After the war

QUALITY AND SERVICE

WESTERN BURLAP BAG CO., Inc.
1109-21 West 38th St. CHICAGO, ILL.

UNCLE SAM

needs fats and oils

The longer the war, the greater the need Uncle Sam has for fats and oils. This is why plants producing fats or oils should be thinking now in terms of added capacity. If you are called upon for greater production, will your plans be ready? Do you know your expansion possibilities—the new equipment you will need—the necessary repairs or parts? Have you the figures to show what production you can obtain through such expansion?

Uncle Sam is going to need more fats and oils. Your part is to hold yourself in readiness to produce them. We urge you to consult with an Expeller Engineer about the possibilities of increasing your production. Remember, too, that after the war all types of equipment will be in great demand. That's another reason for prompt and thorough planning now.

THE V. D. ANDERSON CO.
1958 West 96th Street · Cleveland, Ohio

ANDERSON EXPELLERS

● **CCC TO SELL SEED BEANS.** The U. S. Department of Agriculture has announced a program to assure farmers adequate supplies of soybean seed for planting the 1943 crop. Besides stocks already in the hands of farmers and seed dealers, the processors of soybeans and the Commodity Credit Corporation are cooperating to make additional supplies available. Supplemental supplies will be available to farmers from Government stocks at not more than $2.50 per bushel. These stocks are stored in bins and country warehouses in areas where there was no frost damage last fall.

The terms under which this supplemental supply will be made available by the CCC for planting the 1943 crop follow:

Soybeans of Class 1 (yellow) and Class 2 (green), grading No. 2 or better will be offered to seed dealers in carload lots at $1.85 per bushel, bulk, F.O.B. rail siding at the dealer's plant, on the condition that the dealers will clean, test, furnish germination percentages, sack the beans, and sell them at not more than $2.50 per bushel to farmers.

In cases where soybeans stored in a county are to be sold to a seed dealer in that county for resale to farmers within the county the price to the dealer for Class 1 (yellow) and Class 2 (green) soybeans is $1.75 per bushel in-stored F.O.B. point of storage. In these cases the sale will be made to the dealer on the condition that he will clean, sack, tag, test, furnish germination percentages, and sell to farmers at not more than $2.25 per bushel.

All soybeans sold by dealers to farmers out of stocks purchased from CCC must show a germination of at least 80 percent.

● **SOYBEAN RECEIPTS GRADING SAMPLE.** Nearly one-half of the January inspected receipts of soybeans graded Sample this season and only 22 percent graded No. 2 or better, inspectors' reports to the Grain Products Branch of the Food Distribution Administration show. Out of 5,463 cars inspected only 1,178 cars graded No. 2 or better while 1,101 graded No. 3 and 3,184 No. 4 and Sample grade.

For the four months October 1942 through January 1943 slightly over 40 percent graded No. 2 or better and slightly under 40 percent No. 4 and Sample grade, leaving about 20 percent grading No. 3. During the same months last season about 34 percent of the inspected receipts graded No. 2 or better, 48 percent No. 3 and only about 16 percent No. 4 and Sample grade.

Inspections of soybeans in January included the equivalent of 308 cars inspected as cargo lots, and truck receipts equivalent to about 32 cars.

● **SOYBEANS IN LEND-LEASE**

Purchased by Agricultural Marketing Administration for lend-lease.

	Quantity (Pounds)		
Commodity	**January**	**1942**	**Cumulative**
Oleomargarine	2,626,000	96,000,337	99,755,337
Soyabean Oil	4,740,000	17,505,362	22,245,362
Salad Oils (Misc.)		1,020,000	1,020,000
Shortening	11,250,016	45,609,865	56,459,881
Soybean Pellets	400,000	9,956,000	10,356,000
Soya Products			
Soya Beans		24,000,000	30,980,000
Soya Flour	30,800,000	9,305,000	60,335,000
Soya Grits		60,290,000	60,290,000
Soya Sauce (Cases)		312	312

Government agencies in Washington have received samples of a new "spread," manufactured from soybean oil but containing no milk, that looks and tastes like butter. The manufacturers, who wish to use a trade name for their product, are seeking to determine whether or not, in view of the fact that the Food and Drug definition shows cow's milk as an ingredient of margarine, they must use the designation "margarine" in labeling their product.

WOODSON-TENENT LABORATORIES

MEMPHIS, TENNESSEE and CAIRO, ILLINOIS

Analysis of Soybeans and Products

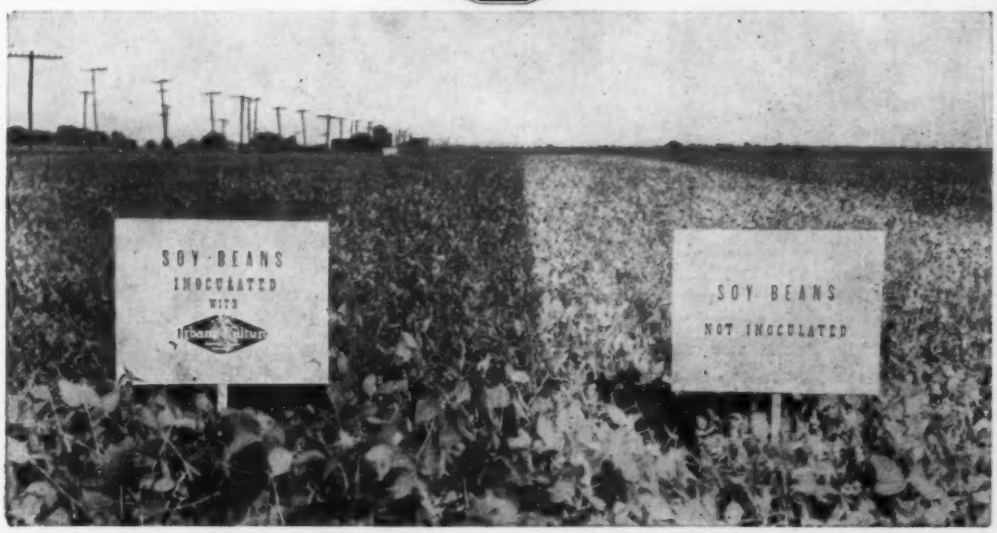
Official Chemists for National Soybean Processors Association

INOCULATE YOUR Soy Beans

with

Urbana Culture
Superior Legume Inoculator

SOY BEANS for VICTORY



It Is Just Good Business to Inoculate and Use the Free Nitrogen of the Air

Prepared only by **THE URBANA LABORATORIES** Urbana, Illinois

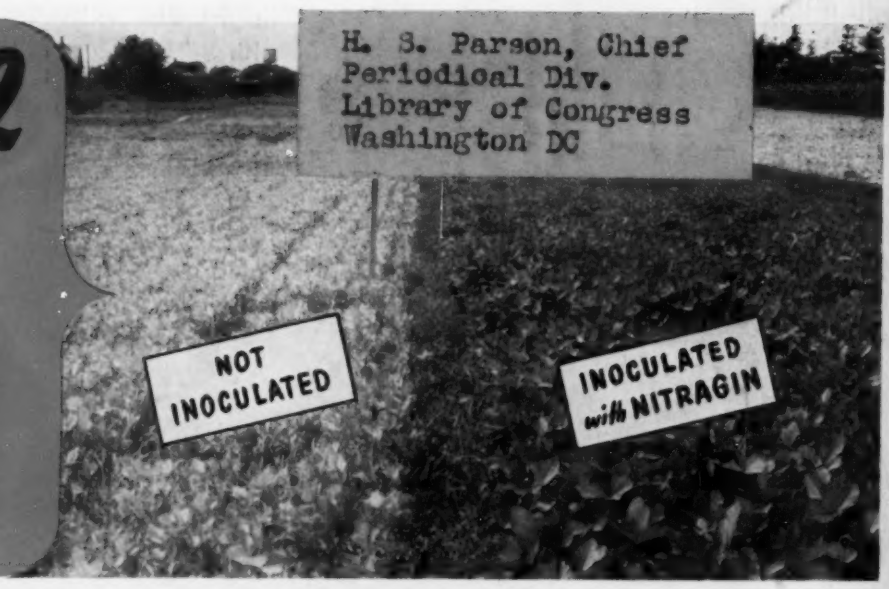
If You Have Poultry or Livestock
and
If You Are a Soybean Grower

Then you should be feeding Purina Chows. These feeds are supplements to your grain and they are made to do a more profitable job of producing pork, eggs, or milk than straight grain will do. And they use soybean meal as a major source of protein. In fact, Purina Mills is the largest user of soybean oilmeal in the country. Use the feeds that utilize the beans you grow! . . . . . **Purina Mills, St. Louis, Mo.**

H. S. Parson, Chief
Periodical Div.
Library of Congress
Washington DC

July 22

This photo of NITRAGIN test plots at an Eastern Experiment Station, taken July 22, shows heavier growth and darker color due to good inoculation. Weeds are gaining rapidly on the thin, less vigorous stand of uninoculated soybeans.



35 days later

By September 1, weeds had completely smothered the nitrogen-hungry crop, NOT inoculated. NITRAGIN that cost 12c an acre made this difference.

On fertile land, uninoculated legumes may look about as good as an inoculated crop — but remember, legumes without inoculating bacteria must get their nitrogen by robbing the soil; inoculated legumes get theirs from the air.

HELP BEAT THE NITROGEN SHORTAGE

WITH NITRAGIN

Four-fifths of the air is nitrogen . . . vital element needed now to increase crop production. The one practical way to make this nitrogen available for plant growth is through legumes inoculated with effective strains of nitrogen-fixing bacteria. An acre of well-inoculated soybeans, it is estimated, can gather as much nitrogen as is contained in 1,000 or more pounds of commercial mixed fertilizer.

This important ability of soybeans, clover, alfalfa, peas and other legumes depends on the presence of the RIGHT legume bacteria. That's why it is important that every planting of legumes be inoculated with NITRAGIN. NITRAGIN contains only selected, tested strains of bacteria produced in the largest, most complete laboratory of its kind in the world.

Your Protection!

The name NITRAGIN is a registered trade name. It identifies the oldest, most widely used brand of inoculation. Look for it when you buy soybean inoculation.

THE NITRAGIN CO., INC., 3872 N. Booth St. MILWAUKEE, WIS.